

Objective clinical performance outcome of total knee prostheses. A study of mobile bearing knees using fluoroscopy, electromyography and roentgenstereophotogrammetry

Garling, E.H.

#### Citation

Garling, E. H. (2008, March 13). Objective clinical performance outcome of total knee prostheses. A study of mobile bearing knees using fluoroscopy, electromyography and roentgenstereophotogrammetry. Retrieved from https://hdl.handle.net/1887/12662

Version: Corrected Publisher's Version

Licence agreement concerning inclusion of doctoral thesis in the License:

<u>Institutional Repository of the University of Leiden</u>

Downloaded from: https://hdl.handle.net/1887/12662

**Note:** To cite this publication please use the final published version (if applicable).

# Acknowledgements

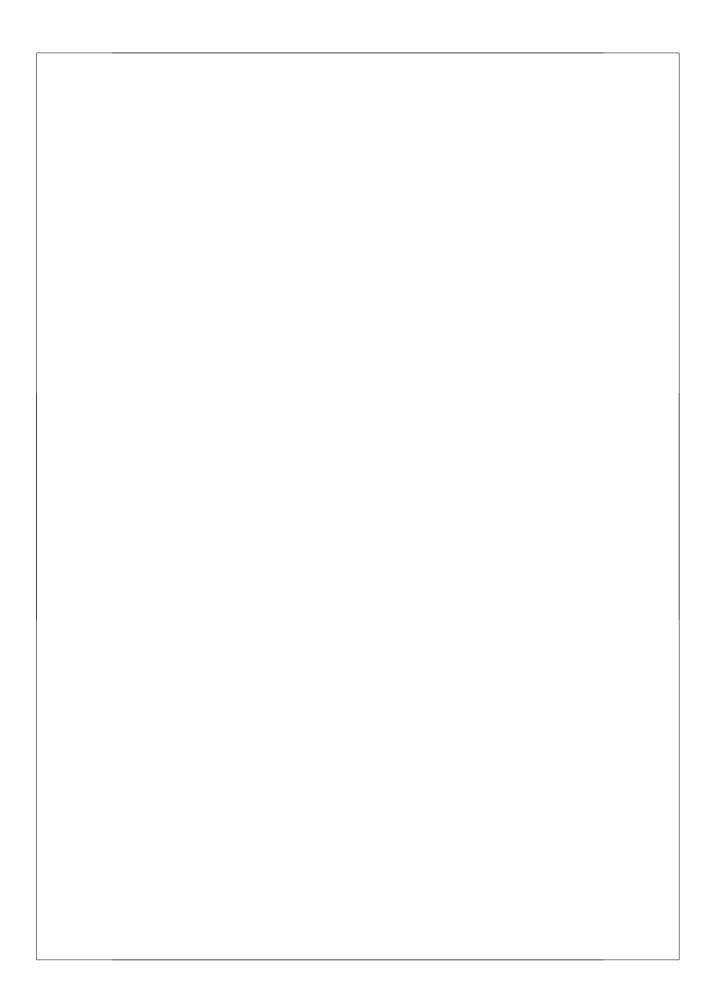
R.G.H.H. anics and

This thesis was prepared at the Department of Orthopaedics (head: prof. dr. R.G.H.H. Nelissen) under supervision of dr. ir. E.R. Valstar, head of the Biomechanics and Imaging group, of the Leiden University Medical Center.

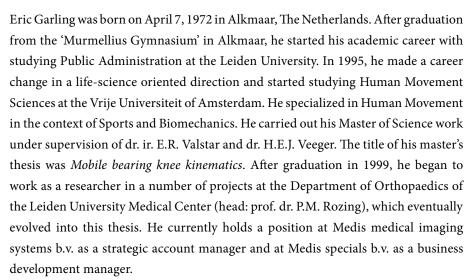
I would like to express my sincere gratitude to Bart Kaptein who gave the fluoroscopy projects an extra impetus with his excellent accomplishments in developing the Model-based RSA software. His positive, can-do attitude was very motivating.

I am also indebted to many people who have contributed in some way to this thesis:

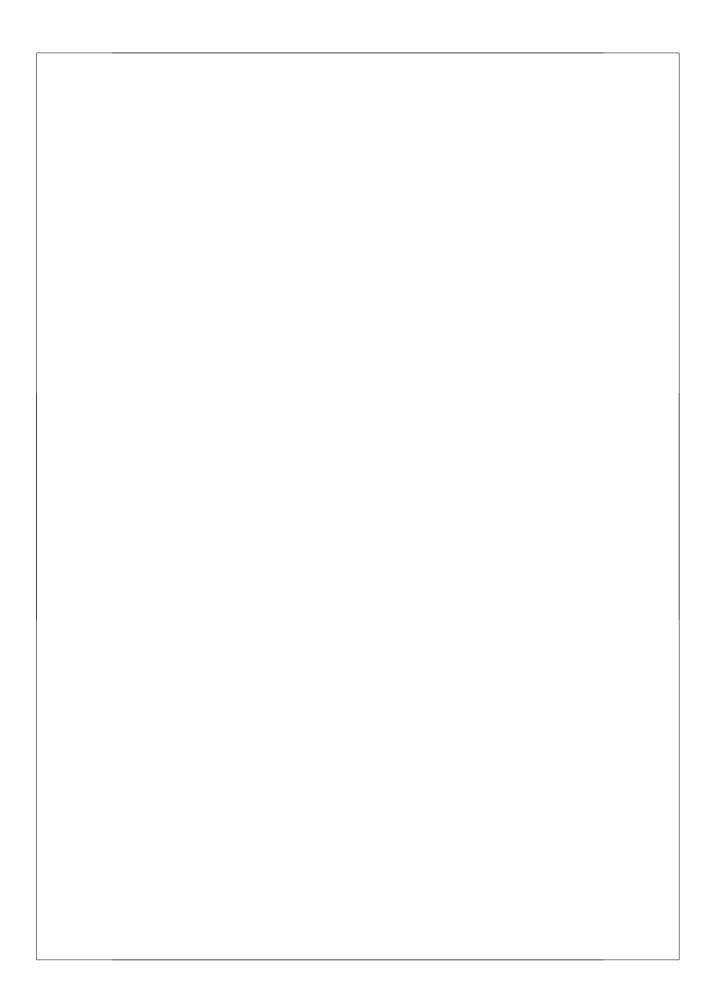
Jaap Harlaar and Caroline Doorenbosch (Vrije Universiteit Medical Center, Amsterdam), who made it possible for me to work in their fantastic gait lab. Nienke, Sanne, Mirjam, Tessa, Liane, Caroline, and Willemijn of the Department of Human Movement Sciences, Vrije Universiteit Amsterdam, who made a considerable contribution to several projects within this thesis. Staff and residents from the Department of Orthopaedics for their clinical contributions. Staff and roentgen assistants from the Department of Radiology. Especially, Dirk Zweers and Koos Geleijns for their advice and assistance during the experimental and clinical fluoroscopy studies. Hans Fraterman, Arie de Vos and Bram Visser who have been extremely helpful for developing and manufacturing devices and experimental set-ups that have been used for this research project. Administrative staff of the Department of Orthopaedics for general assistance. My colleagues at Medis for making it possible to continue to work in a challenging environment.



# Curriculum Vitae







## **Publications**

#### Publications related to this thesis

Garling EH, Kaptein BL, Geleijns K, Nelissen RGHH, Valstar ER. Marker Configuration Model Based Roentgen Fluoroscopic Analysis. *J Biomech* 2005; 38(4): 893-901.

Garling EH, Kaptein BL, Mertens B, Barendregt W, Veeger HEJ, Nelissen RGHH, Valstar ER. Softtissue artefact assessment during step-up using fluoroscopy and skin-mounted markers . *J Biomech* 2007; 40(1): S18-S24.

**Garling EH, Kaptein BL, Nelissen RGHH, Valstar ER.** Limited motion of the mobile bearing in a rotating platform total knee prosthesis. *J Biomech* 2007; 40(1): S25-S30.

**Garling EH, Valstar ER, Nelissen RGHH.** Comparison of micromotion in mobile bearing and posterior stabilized total knee prostheses: a randomized RSA study of 40 knees followed for 2 years. *Acta Orthop Scand*; 76(3): 353-61.

Garling EH, van Eck M, Wedding T, Veeger HEJ, Valstar ER, Nelissen RGHH. Increased muscle activity to stabilise mobile bearing knees in patients with Rheumatoid Arthritis. *Knee* 2005; 12(3): 177-82

Garling EH, Wolterbeek N, Velzeboer S, Nelissen RGHH, Valstar ER, Doorenbosch CA, Harlaar J. The effect of a mobile bearing total knee prosthesis on co-contraction during a step-up task. *Knee Surg Sports Traumatol Arthrosc*; accepted. Abstract in *J Biomech* 2006; 39: S131.

**Linde van der MJA, Garling EH, Valstar ER, Tonino AJ, Nelissen RGHH**. The effect of periapatite on the micromotion of total knee arthroplasty tibial components in rheumatoid arthritis patients. *Clin Orthop Rel Res* 2006; 448:122-128.

### Publications not related to this thesis

Beumer A, Valstar ER, Garling EH, Leeuwen WJ, Sikma W, Niesing R, Ranstam J, Swierstra BA. External rotation stress imaging in syndesmotic injuries of the ankle. Lateral radiography and radiostereometry compared in a cadaveric model. *Acta Orthop Scand* 2003; 74(2): 201-205.

Beumer A, Valstar ER, Garling EH, Niesing R, Ranstam J, Löfvenberg R, Swierstra BA. Kinematics of the distal tibiofibular syndesmosis. Roentgen stereophotogrammetric analysis in 11 normal ankles. *Acta Orthop Scand* 2003; 74(3): 3367-343.

Beumer A, Valstar ER, Garling EH, Niesing R, Ginai AZ, Ranstam J, Swierstra BA. Effects of ligament sectioning on the kinematics of the distal tibiofibular syndesmosis. A radiostereometric study of 10 cadaveric specimens focused on presumed trauma mechanisms and possibilities of treatment. *Acta Orthop Scand* 2006; 77(3):531-40.

Beumer A, Valstar ER, Garling EH, Niesing R, Heijboer RP, Ranstam J, Swierstra BA. Kinematics before and after reconstruction of the anterior syndesmosis of the ankle. A prospective radiostereometric and clinical study in 5 patients. *Acta Orthop Scand* 2005; 76(5): 713-720.



Koning OHJ, Oudegeest OR, Valstar ER, Garling EH, Linden van den E, Hinnen JW, Hamming JF, Vossepoel AM, van Bockel JH. Roentgen Stereophotogrammetric Analysis: an accurate tool to assess endovascular stentgraft migration. *J Endovasc Therap* 2006; 13(4): 468-475.

Koning OHJ, Garling EH, Hinnen JW, Kroft LJM, van der Linden E, Hamming JF, Valstar ER, van Bockel JH. Accurate detection of stent-graft migration in a pulsatile aortic model using roentgen stereophotogrammetric analysis. *J Endovasc Therap* 2007; 14(1): 30-38.

Koning OHJ, Garling EH, Hinnen JW, Kroft LJM, van der Linden E, Hamming JF, Valstar ER, van Bockel JH. Roentgen Stereophotogrammetric Analysis to detect stentgraft migration in an animal model. *J Endovasc Therap* 2007; in press.

Koning OHJ, Kaptein BL, Garling EH, Hinnen JW, Hamming JF, Valstar ER, Bockel JH. Assessment of three-dimensional stent-graft dynamics by using fluoroscopic roentgenographic stereophotogrammetric analysis. *J Vasc Surg* 2007; 46(4): 773-779.

**Nelissen RGHH, Garling EH, Valstar ER**. Influence of cement viscosity and cement mantle thickness on migration of the Exeter total hip prosthesis. *J Arthroplasty* 2005; 20(4): 521-528.

**Nelissen RGHH, Valstar ER, Pöll RG, Garling EH, Brand R.** Factors associated with excessive migration in bone impaction hip revision surgery: a radiostereometric analysis study. *J Arthroplasty* 2002; 17(7): 826-833.

Rozendaal RM, Koes BW, van Osch GJVM, Uitterlinden EJ, Garling EH, Ginai AZ, Verhaar JAN, Weinans H, Bierma-Zeinstra SMA. Effect of glucosamine sulfate on joint space narrowing, pain, and function in patients with hip osteoarthritis. A Randomized Trial. *Annals of Internal Medicine* 2008; in press.

**Stokdijk M, Nagels J, Garling EH, Rozing PM**. The kinematic elbow axis as a parameter to evaluate total elbow replacement. A cadaver study of the iBP Elbow System. *J Shoulder Elbow Surg* 2003; 12(1): 63-68.

**Valstar ER, Garling EH, Rozing PM.** Micromotion of the Souter-Stratchclyde total elbow prosthesis in patients with rheumatoid arthritis. *Acta Orthop Scand* 2002; 73(3): 257-263.